

stantly exhibited by his subjects, but we confess that our faith in these attributes is of the weakest. The female *Lycosid* may carry her own young, but she will also carry any other young family indiscriminately, and the author refrains from telling us that *Atypus affinis* will devour her own brood should they unduly delay their departure from the parental abode. The elaborate nest once begun by *Agelena* will be carefully completed and guarded, whether the eggs are removed or not. Mr. Ellis tells us that his book is primarily intended for young folk, but it will undoubtedly be of interest both to the naturalist and the general reader.

(3) In this work the authors have provided a text-book for beginners undertaking a course of elementary entomology. The book is divided into three sections, the structure and growth of insects, descriptions of species typical of the orders, and a section containing a series of laboratory exercises, together with a key to the orders and information concerning the apparatus and methods employed in collecting and preserving. We have rarely seen a work in which so large an amount of information is compressed into so small a space, and the text is well and profusely illustrated. Such errors as we have found are but few, and detract little from the general usefulness of the work. The statement that the mouth parts of *Lepidoptera* are so formed as to preclude injury to vegetation is scarcely correct, since at least two African Noctuids do no small damage to peaches by piercing the skin and sucking the juices, whilst the Australian *Ophideres fullonica* attacks oranges, and, as pointed out by Francis Darwin many years ago, has the proboscis specially modified in adaptation to its habits. The statement that all moths are night flyers seems to require some modification.

So long as there is no universally accepted classification of the *Insecta* we must refrain from too great comment on this portion of the work, though we think it would have been better to point out the sexual differences in the tarsi of the *Nymphalidæ* and *Lycænidæ*, and the *Erycinidæ* should find a place in even a condensed table. Compared with the general utility of the work these are, however, but small matters, and will doubtless be amended in a second edition, which we fully expect will soon be required.

(4) The author of this work has drawn upon his wide and lengthy experience of collecting to provide an extremely pleasant and readable account of a selection of European *Lepidoptera*. We confess to a feeling of satisfaction that the work tends to lead the young lepidopterist away from the narrow insularity so long and painfully associated with the old-fashioned British collector. The inflated value often placed on British examples of species which may be pests on the Continent is essentially unscientific. For the collector who can extend his field to the Continent Mr. Rowland-Brown's work provides just the information which will awaken and maintain a healthy interest in the subject.

In criticising the coloured plates one must bear in mind the low cost of the volume, and if the figures are not always typical of the best in lithographic art they are at least free from that crudeness of execution which is not always absent from many more costly productions. Whilst we find no fault with the work itself we trust the author's well-known talents, both as a writer and a naturalist, will soon find expression in a volume of a more advanced type.

#### NATURAL AND SYNTHETIC RUBBER.

UNDER the above title an interesting address was delivered by Dr. F. Mollwo Perkin before the Society of Arts on December 11. After briefly reviewing the history of the development of the indiarubber industry and the nature of the processes used in extracting the natural product and in vulcanisation, an account was given of the recent synthetic processes by which the manufacture of artificial rubber on the large scale has become a commercial possibility. In the process of the Synthetic Products Co. isoprene is made from fusel oil, which is fractionated so as to give isoamyl alcohol,  $\text{CH}(\text{CH}_3)_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{OH}$ , which is converted into the chloride,  $\text{CH}(\text{CH}_3)_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{Cl}$  by the action of hydrochloric acid and then into the dichloride  $\text{C}(\text{CH}_3)_2 \text{Cl} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{Cl}$  by the action of chlorine, under specially controlled conditions; the dichloride obtained is passed through a tube heated at  $470^\circ$  and filled with soda-lime, whereby it is converted into isoprene, which can be polymerised to rubber by means of small quantities of sodium.

The only difficulty in the way of this process is the cost of the raw product, amyl alcohol, which is about 140l. per ton. On this account, Prof. W. H. Perkin, with E. H. Strange, F. E. Matthews, and Prof. Fernbach, devised a process for obtaining butyl alcohol cheaply, from which butadiene could be obtained. By the employment of a certain organism, it was found possible to ferment starch, and, more recently, sawdust, so as to obtain butyl alcohol and acetone, the latter being sold, thus cheapening the cost of the butyl alcohol. The butyl alcohol is chlorinated in the same way as the isoamyl alcohol, and by similar treatment with soda lime yields butadiene,  $\text{CH}_2 \cdot \text{CH} \cdot \text{CH} \cdot \text{CH}_2$ , which on polymerisation gives a rubber which, although not chemically identical with the polymerised isoprene, has all the properties of natural rubber in regard to elasticity and behaviour towards sulphur on vulcanisation.

An account was also given in the lecture of the processes devised by the firm of Friedrich Bayer, of Elberfeld, and of the interesting fact discovered by Prof. Harries that the presence of a small quantity of rubber ozonide very much increases the rapidity of polymerisation of isoprene and its derivatives.

In discussing the question of the competition of natural and synthetic rubber, it is pointed out that "at present prices and with the present supply and demand there is no reason, provided synthetic

rubber is as good as natural rubber, why the two should not exist side by side." But the rubber planter is bidden take heed of the lesson taught by the fate of the natural alizarin and indigo industries and consider possibilities of improving the yield of natural rubber by better methods of tapping, coagulation, the study of agricultural conditions, and possible improvements by fertilisation and the suppression of insect pests, which play havoc with the young trees. It is a significant fact that the Badische Anilin und Soda-Fabrik has agreed to put by 1,000,000*l.* for research in connection with synthetic rubber, just as nearly 1,000,000*l.* was expended by the same firm in research before synthetic indigo was placed on the market.

#### MOVEMENTS OF GLACIERS.<sup>1</sup>

THE seventeenth report of the Commission Internationale des Glaciers makes its appearance for the year 1911, in conformity with the decision at the Stockholm meeting, without waiting for laggard documents. We learn from it that on the Swiss Alps the majority of the glaciers are still decreasing, probably in consequence of the hot summer of 1911, only three showing signs of an advance, the reason of which remains to be discovered. In the Eastern Alps the observations include eight groups out of twelve, and these show that the fairly general advance of 1910 has not been maintained. In the Italian Alps the retreat, except in a few cases, has been general, as in the previous years, that of the southern end of the Brenva Glacier (Mt. Blanc) having been sixty metres.

The report from the French Alps has not yet been received, but it is not likely to differ materially from the others, so that in this chain the diminution which began about half a century ago has now continued considerably longer than the time which was supposed to be its average one. Of the Scandinavian glaciers, four out of the five observed in Sweden show a marked advance. In Norway a larger number has been studied—in Jotunheim twenty-seven, and in different parts of western Norway twenty-three. In the former district only two show an advance, the remainder being in retreat. In the latter about half the Jostedalstræ are moving one way and half the other, but the Okstind (five) and two of the Frostis (three) are advancing.

The report, owing to early publication, does not include returns from Russia, Asia, and America, so that general conclusions cannot be drawn; but we may perhaps infer that no marked change is likely to be indicated. The value, however, of summarised systematic observations such as these is very great, because they form the first step—and a very long one—in ascertaining the causes which bring about these periodic oscillations of the ice-streams.

T. G. B.

<sup>1</sup> "Les Variations Périodiques des Glaciers." xvii Rapport, 1911. Rédigé par Charles Rabot et E. Muret. (Extrait des "Annales de Glaciologie," t. vii., pp. 37-47.) (Berlin: Borntraeger Frères, 1912.)

#### THE PROTECTION OF ANCIENT MONUMENTS.

THE last report of the Inspector of Ancient Monuments, Mr. C. R. Peers, with an introduction by the First Commissioner, Earl Beauchamp, describes the limitations under which the work of the Department is conducted at present. The existing Acts are merely permissive, and the State can exercise no supervision, except with the consent, and indeed by the desire, of the owner. Earl Beauchamp believes that his Department should be invested with the power of intervention when monuments are suffering from neglect, or are threatened with actual damage or destruction, a view in which all antiquaries will concur.

Even under the present restrictions much useful work is being done. The most important operations were at Carnarvon Castle in anticipation of the investiture of H.R.H. the Prince of Wales, in the course of which much ancient work was cleared and repaired. At the Chapel Royal, Holyrood, the discovery of the foundations of an ancient church, with apparently contemporary interments, has disproved the legend that the palace was founded in 1124 on a site till then uninhabited. At the Tower of London the Bell Tower and the turret flanking the Byward Gate had been repaired. At Old Sarum the excavations conducted by the Society of Antiquaries have disclosed the plan of the Castle buildings.

Among the most interesting buildings placed in charge of the Department during the year were the Old Machar Cathedral at Aberdeen; the Gateway Tower of Chester Castle; Richard III.'s Tower at Carlisle; Kirby Muxloe Castle in Leicestershire; and the Bishop's and Earl's Palaces at Kirkwall.

Good progress has been made in the preparation of the County Inventories of Historical Monuments, of which five volumes have been issued, and scientific inquiries are in progress for the prevention of decay in stone-work. It may be hoped that Parliament will soon find time to complete the measures for the adequate protection of historical monuments throughout the country.

#### NOTES.

THE names of few men associated with scientific work appear in the list of New Year Honours. Three fellows of the Royal Society are among the recipients of honours, namely Mr. Francis Darwin, upon whom a knighthood is conferred; Dr. A. G. Bourne, Director of Public Instruction, Madras, who is made a Knight Commander of the Order of the Indian Empire (K.C.I.E.); and Dr. W. R. Dunstan, director of the Imperial Institute, who has been appointed a Companion of the Order of St. Michael and St. George (C.M.G.). Other names of men known in the scientific world are Sir Frank Crisp, a new baronet, for many years treasurer and vice-president of the Linnean Society, and honorary secretary of the Royal Microscopical Society from 1878 to 1889; Dr. R. W. Philip (knighthood), distinguished by his work